

## APPLICATION NOTE AN-C35/1

Date 27/1/86

Last Revision 27/1/86

### Suggested Links on FDC-1 Card for use with 1 MByte 3.5" Panasonic Drives

#### Introduction.

One of the major strengths of the Interak FDC-1 Card is its great flexibility in coping with all manner of differing types of floppy disk drive. This is also a weakness for the poor typical user who is using modern standard disk drives and doesn't care about strange setups - he just wants to know how to make a perfectly normal arrangement work, as quickly as possible.

To aid this class of users here is a list of links to be made on the FDC-1 Card to suit the Panasonic brand of 3.5" 1 Megabyte (unformatted) disk drive.

#### 0.1" Pin assemblies P1-P19, and P20

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P1	Link 2-3	The settings on P1 and P2 are at the user's option
P2	Link 2-3	. . . and select a "Motors On" time 5 - 15 seconds.
P3	Link 1-2	Use the "Ready" signals produced by the drives.
P4	Link 2-3	"Motors On" under monostable control.
P5	No Link	Test Points Only.
P6	Link 2-3	Disable "Auto Deselect" feature.
P7	Link 1-2	"Lock Doors" (has no effect on non-8" interface).
P8	Link 1-2	Allows system to reset configuration latch.
P9	No Link	Test Points Only.
P10	Link 1-2	Suits the standard 2797 chip (side select output).
P11	Link 1-2	Normal mode (ie not "Test" mode).
P12	Link 1-2	Allow system to read motor control monostable.
P13	Link 1-2	Settings here on P13 and P14 are for head load time
P14	Link 2-3	. . . of 50 ms to suit other drives, you can use less.
P15	No Link	Unused - DRQ and INTRQ outputs only.
P16	Link 1-2	Disable "Local Reset"
P17	Link 1-2	P17, P18, and P19 select write enable precompensation.
P18	Link 1-2	. . . Panasonic do not insist this be applied, but
P19	Link 3-4	. . . these settings apply automatic precompensation.
P20	No Link	Unused signal.

#### DIL Headers DH2, DH3

The standard links given in the FDC-1 Manual under the heading Links '(b) For the non-8" (34-way) Interface', will be perfectly suitable for the Panasonic drives.

For your convenience they are repeated here (overleaf):

## DH2

1	16	
2-----	15	Ready (L)
3	14	
4	13	
5-----	12	Side 1 Select (L)
6-----	11	Motor On (L)
7-----	10	Head Load (L)
8	9	

Note on DH2:

The head is automatically loaded on the Panasonic Drive whenever the user inserts a diskette; there is therefore no "Head Load" line on these drives. Instead the drives have another optional function "In Use", which is not generally employed. However the connection given above between pins 7 and 10 on DIL header DH2 is retained simply for compatibility with those drives which do use the "Head Load" signal.

## DH3

1	16	
2-----	15	Index (L)
3	14	
4-----	13	Drive Select 3 (L)
5	12	
6	11	
7	10	
8	9	

Note on DH3:

The Panasonic Drive has two special signals on pins 1 and 2 of the 34-way interface. You can ignore both of these in this application, since our present disk operating systems are not able to take advantage of these special features. If you have a manual on the Panasonic drives (drives and manuals for sale by us) and are studying the interface for yourself, do not be alarmed that the standard interface cable earths signal line 1 (as it does for all the odd-numbered connections) - it is perfectly permissible to earth this input on the Panasonic Drive. The output signal from the drive on the signal line 2 also needs no special arrangements because it is connected open circuit on the FDC-1 card (terminating on pins 6,7,8 of DH3).

## Setting up instructions for FDC-1 Card

The card can be set up entirely "by the book", ie as described in the FDC-1 Manual, although of course if the card is to be used exclusively with the Panasonic 3.5" disks, there is hardly any need to bother with the settings for 8". We still recommend however that all adjustments be made correctly regardless of whether or not they are all relevant to a particular system; then there is no chance of a mistake caused by an accidental omission of an adjustment which should have been made. No

experiments have been carried out to determine the optimum amount of write enable precompensation for the Panasonic drives; Panasonic do not specify a figure and imply that the drives will perform highly reliably without any precompensation, therefore we suggest that only a modest amount need be applied, eg 150 ns.

#### Setting up instructions for Panasonic Drives

This model of Panasonic 3.5" 1 Megabyte drive is supplied ready for immediate use. However, if you have more than one disk drive in the system the second and later drives will need one selection link changing on each drive. Up to 4 drives can be fitted per standard FDC-1 card, and they are called "A", "B", "C", and "D" - corresponding to Panasonic's identifications "Drive Select 0", "1", "2", and "3" respectively, although confusingly Panasonic sometimes also refer to them as "Drive Select 1", "2", "3", and "4".

We suggest that if your drives are mounted above one another the top one should be called "A", the one beneath "B", and so on, and if they are arranged side by side they should be called "A", "B", "C", etc., from left to right.

When more than one drive is used in a system it must be allocated to a different select line. The first drive is always "Drive A" in the present Interak system, and up to three more drives are "B", "C", "D", added in any order but usually in the order listed. The recommended links on "P2" on the disk drives themselves depend on whether the drive is to be "A", "B", "C", or "D" and are given in the tables below. (You are strongly recommended to purchase a copy of the OEM Manual for the disk drives. We can supply it under our Part Number MFDD3501 for 5.00 pounds, nil VAT).

<u>"A"</u>	<u>"B"</u>	<u>"C"</u>	<u>"D"</u>
2----1	2 1	2 1	2 1
4 3	4----3	4 3	4 3
6 5	6 5	6----5	6 5
8----7	8----7	8----7	8----7
10 9	10 9	10 9	10----9
12 11	12 11	12 11	12 11
14----13	14----13	14----13	14----13
16 15	16 15	16 15	16 15
18----17	18----17	18----17	18----17

#### Termination Resistors

Those with earlier experience of disk drives will wonder why there is no mention of unplugging and re-siting terminating resistor packs. With this type of drive it is unnecessary because each drive is supplied with a permanent terminating resistor (being a pull up resistor to +5V of value 1k) on all the appropriate signal lines, the inputs to the drive. Even with 4 drives connected the burden on each of the FDC-1 card signal outputs is only 20 mA, which it can easily sustain as it has drivers capable of sinking up to 40 mA.

Because 1k is several times larger than the optimum value for this kind of connection, the length of signal ribbon cable is restricted to 1 metre or so (say 1.5 metres maximum).

#### Physical connections

The power supply is via a 4-pin 0.1" pitch connector. When available an exact mating connector will be supplied, but initially supply difficulties may result in our having to supply a near equivalent. Sadly the equivalent has some projecting pieces and a ridge which must be filed off before use. Both types of connector are used with crimp terminals which are mounted to the cable before pushing into the plastic housing in such a way that a projecting barb on the metal terminal keeps it in position in the plastic housing.

Note that 2 earth terminals are allocated and both should be fitted. One should be twisted with the +12 V power supply input and the other with the +5 V power supply input.

We suggest the following colours for the power supplies:

Pin 1	+5 V	Red
Pin 2	0 V	Green (twisted with wire from pin 1)
Pin 3	0 V	Green (twisted with wire from pin 4)
Pin 4	+12 V	Orange

Incorrect connection will probably cause great damage! (Consult the Manual for the disk drive.)

Do not make the power supply twisted pairs any longer than you need, and use the biggest gauge wire that will fit into the crimp terminals.

The 34-way ribbon interface cable plugs onto the 34-way header in each drive. Ensure wire number 1 (which is usually marked on the cable with a blue or red stripe) corresponds with header pin 1. Most manufacturers of 3.5" drives, Panasonic included, have employed a type of 34-way header onto which it is possible to plug the ribbon cable wrongly, so check visually before leaving this part of the job. (Polarisation by means of removing one of the 34 available pins is sometimes employed, but this is not recommended by us, because not all disk drive manufacturers do this at the moment. Another means of polarisation is to use the "bump" on the type of ribbon cable connector which is "bump polarised"; this is the type we favour but not all manufacturers of 3.5" drives can accommodate connectors of this type. If we supply both drives and cable then we will do our best to supply the most appropriate type of connector.

At the other end of the cable, (the end which plugs into the FDC-1 card), a 50 way connector is used. If you are making your own, instead of buying the ready made assembly from us, note that the 34-way ribbon cable should be terminated into the 50-way connector in such a way that wires 1-34 of the cable correspond to pins 18-50 (ie not pins 1-34) of the 50-way connector. (Blame Shugart who chose the signals, not us, if this seems illogical!)

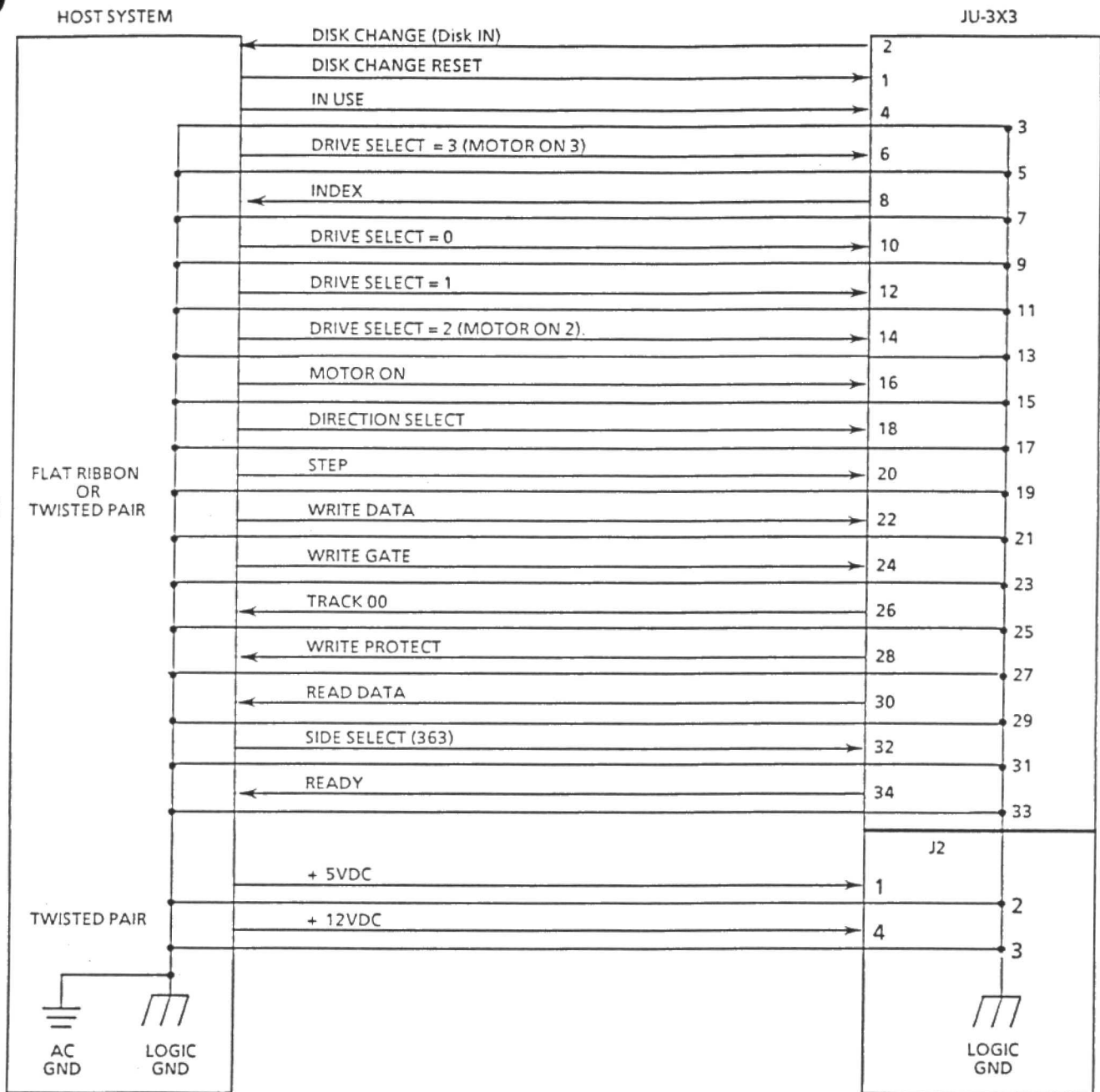


FIGURE 2-1 INTERFACE CONNECTIONS

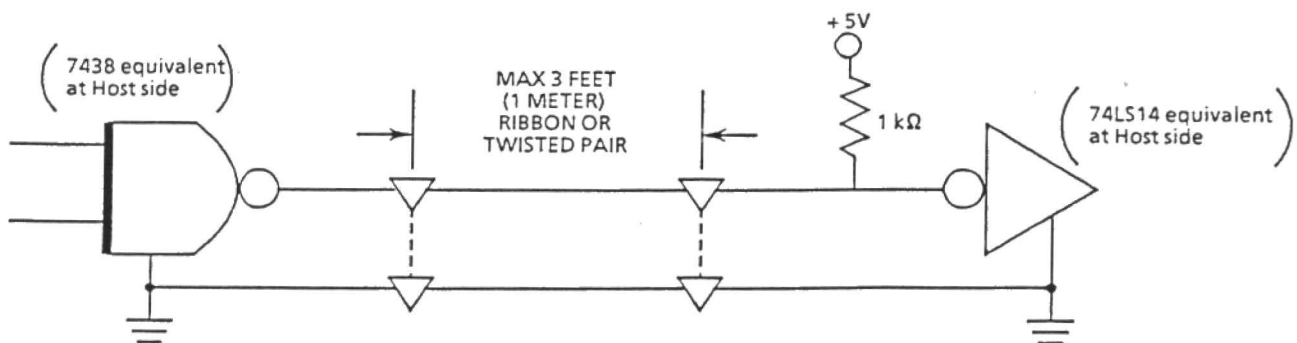


FIGURE 2-2 INTERFACE SIGNAL DRIVER/RECEIVER

### 3.2 J1/P1 CONNECTOR (I/F CONNECTOR)

Connection to J1 is through a PCB pin type connector. The dimensions and location of J1 for the connector are shown in figure 3-2. Pins are numbered 1 through 34 with the even-numbered pins on the top row. Pins 1, 2, and 34 are numbered on the PCB. Keying is not available with this connector. The recommended connectors for J1/P1 are shown in table 3-1.

TABLE 3-1. RECOMMENDED J1/P1 CONNECTORS

J1 (DRIVE)	P1 (HOST)	MANUFACTURER
MIF3-34PA-2.54DS	HIF 3B-34D-2.54R	HIROSE

Recommended the few of other connectors.  
AMP: 172533-5 OR 172534-5  
3M: 3414-6500 OR 3414-6000

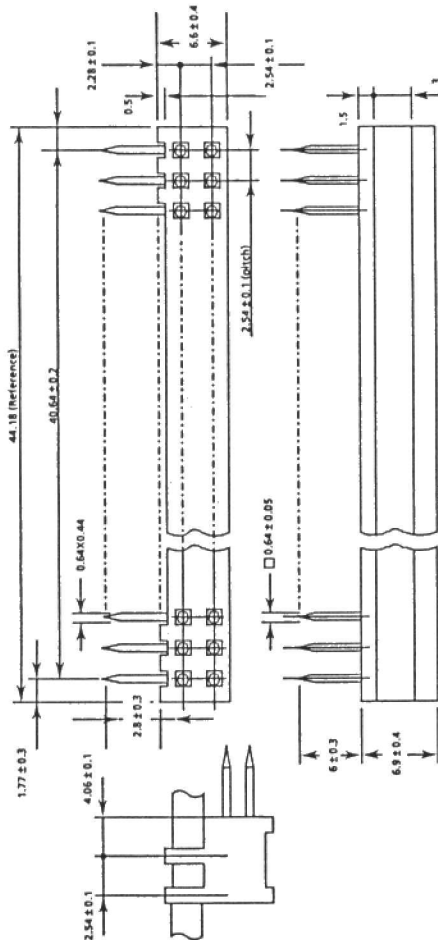


FIGURE 3-2. J1 CONNECTOR

### 3.3 J2/P2 CONNECTOR (POWER CONNECTOR)

The dc power connector, J2, is mounted on the component side of the PCB and is located opposite the side of the stepper motor. J2 is a 4-pin AMP data connector P/N 171826-4. The recommended mating connector (P2) is AMP P/N 171822-4 utilizing AMP pins P/N 170204-2. J2, pin 1, is labeled on the component side of the PCB.

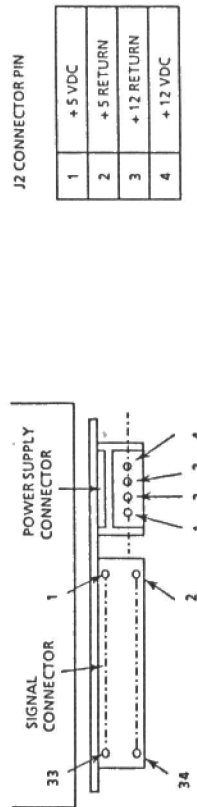


FIGURE 3-3. J1/J2 CONNECTOR

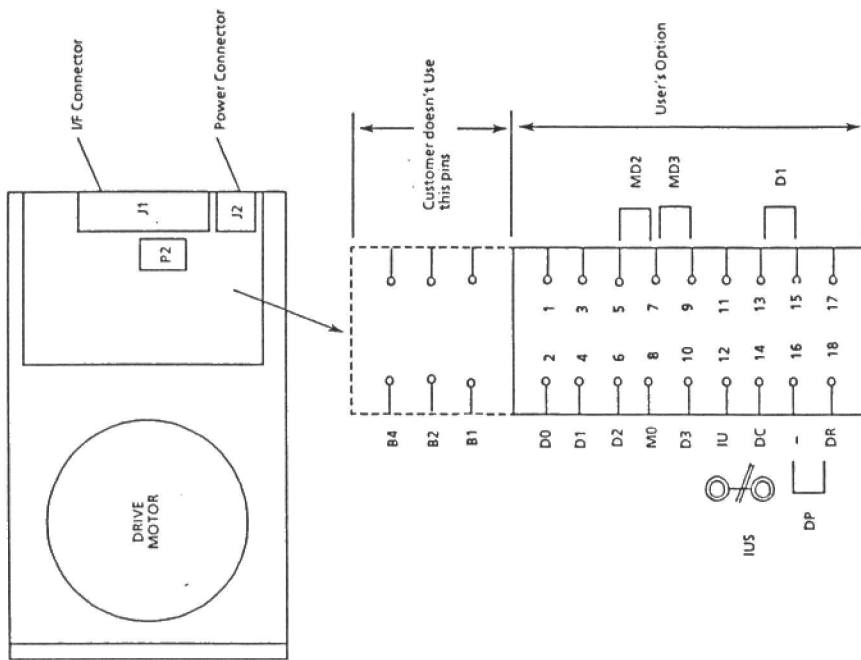


FIGURE 7-2. SHORTING BAR P2 PIN ASSIGNMENT

DEM MOUNT AVAILABLE (A4)  
PRICE / 5.00